4.4 ACID-BASE REACTIONS

-acids: sour taste

-Bases: bitter taste, soapy

-(DO NOT TASTE CHEMICALS IN THE LAB!!)

Table. 4.2 pg 106

Acids and Bases

Acids and Bases have the ability \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in certain dyes.

Acid-base indicator: dye used to distinguish between acidic and basic solutions by means of the color changes it undergoes in these solutions.

Ex. Ice tea and lemon juice

DEFINITIONS OF ACID AND BASE

-acid: substance that produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

H+ , when it dissolves in water.

H2O

HNO3(aq) 🡪 H+(aq) + NO3-(aq)

-base: substance that produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, OH-, when it dissolves in water.

H2O

NaOH 🡪 Na+(aq) + OH-(aq)

NH3 + H2O 🡪 🡨 NH4+(aq) + OH-(aq)

Arrhenius definition.

(another definition)

Bronsted and Lowry:

Acid: species that donates a proton to another species in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Base: species that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a proton in a proton-transfer reaction.

Pg. 107

NH3(aq) + H2O 🡪 🡨 NH4+(aq) + OH-(aq)

Base Acid

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Difference between Arrhenius and Bronsted-Lowry definition of acid and base.

STRONG AND WEAK ACIDS AND BASES

**Strong** **acid**: acid that ionizes completely in water; it is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

HCL(aq) + H2O(l) 🡪 H3O+(aq) + Cl-(aq)

**Weak** **acid**: only partly ionizes in water

HCN(aq) + H2O 🡪 🡨 H3O+(aq) + CN-(aq)

**Strong** **base**: base that is found \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in an aqueous solution, OH-

NaOH(s) 🡪 Na+(aq) + OH-(aq)

**Weak** **base**: a base that only partly ionized in water; it is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Ammonia, NH3 is an example.

NH3(aq) + H2O(l) 🡪 🡨 NH4+(aq) + OH-(aq)

Pg. 108 table 4.3

Represent strong acids and bases by the ions they form in a reaction.

Example 4.4

Classifying Acids and Bases as Strong or Weak

Identify each of the following compounds as a strong or weak acid or base.

a.LiOH b. HC2H3O2 c. HBr d. HNO2

Table 4.3

Practice Problems

4.23 Classify each of the following as a strong or weak acid or base.

a. HF

b. HNO2

c. HClO4

d. NH3

4.24 Classify each of the following as a strong or weak acid or base.

1. HBrO
2. HCNO
3. Ca(OH)­2
4. HI